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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003902294 for a patent by YARRA RIDGE PTY LTD as filed on 13 May 2003.



WITNESS my hand this
Twenty-first day of August 2003

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Field of the Invention

This invention relates to locks for displaceable wings.

Description of the Drawings

5 Embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a schematic side view of the lock body (one side of casing removed) when the rectilinearly displaceable bolt is partly extended in a pre-latching configuration.

Figure 2 is an isometric view of the lock of Figure 1

10 Figure 3 is a schematic side view of the lock of Figure 1 adapted for a pivotal bolt.

Figure 4 is an isometric view of the lock of Figure 3

Definitions and Conventions employed

15 *This specification describes LOCK/S (as defined below) substantially as described herein with reference to and as illustrated in the accompanying drawings.*

Throughout this specification and claims which follow, unless the context requires otherwise, the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of
20 *integers but not the exclusion of any other integer or group of integers.*

Throughout this specification and claims which follow, unless the context requires otherwise, the positional prepositions such as rear, forward are used to assist in description of the preferred embodiments and with reference to the accompanying drawings and have in general no absolute significance.

25 *Throughout this specification and claims which follow, unless the context requires otherwise, the word wing embraces both displaceable doors and windows.*

*Throughout this specification and claims which follow, unless the context requires otherwise: **latching** means displacement of the **latch-bolt** against **biasing means** by an **engageable means** (in one form comprising a **strike plate**) and*
30 *subsequent displacement of the latch-bolt into engagement with the engageable means (in one form comprising an **aperture** of the strike plate) under the action of the **biasing means**; **latch-bolt** is an outwardly biased bolt capable of executing latching; **auxiliary bolt** means an outwardly biased plunger that is operably associated with the latch bolt ;*

unlatching means withdrawel of the latch-bolt from engagement with the engageable means; **unlatching lever** is a lever or knob that is hand operable to cause the latch-bolt to become disengaged; **locking means** configuring the lock to restrain it from becoming unlatched; **deadlocking means** means means to configure the lock to restrain the latch-bolt from being displaced from the configuration that it assumes when engaged with the engageable means (in the case of a rectilinearly displaceable bolt it assumes a fully extended position when engaged with the engageable means) ; **remote-lock** means a locking means disposed from the lock that includes a remote bolt that is operably connected to the lock – often there is an upper and a lower remote-lock situated above and below the lock; **french door** means a door comprising a hollow frame with a glass in-fill where the hollow within the frame is comparatively small in depth, and **security doors** means a door comprising a hollow framed with an in-fill where the hollow within the frame is comparatively small in depth and in width - some security doors having a close weaved infil material, some having expanded aluminium mesh; **lock-body** is the lock portion fitted within the hollow frame of the wing; **depth of lock-body** is the extent of the lock body in a direction parallel to the face of the door; **width of lock-body** is the extent of the lock body in a direction at right-angles to the face of the door; **free-rotation-cylinder** (also called a free-movement-cylinder) is a cylinder comprising a key operable barrel within a **cylinder housing** connected to a **first cam** (in one form [and commonly] having a radially protruding arm) with free movement, said free-rotation-cylinder preferably comprising a **double cylinder** sub-assembly comprised of opposed barrels each connected with free movement to the same first cam such that the cam is free (between limits) to be angularly displaced while the barrels remain undisplaced.. This type of (free rotation) cylinder is commonly used in security door locks in Australia – it enable the cam to be displaced by either barrel to a locking configuration and then the barrel to be reverse rotated to an undisplaced position enabling key removal while leaving the cam in the locking position. This type of cylinder is distinct from more commonly used double cylinders that employ clutches and that do not have free rotation between the barrels and first cam.

This and the other provisional applications cited in the complete applications associated with this provisional describe inventions comprising improved complete locks for displaceable wings and improvements for locks for displaceable wings, [for convenience referred to herein as "LOCK/S"] – the improvements being transportable

into other locks and locking devices without being limited to the complete locks described herein.

It is intended that each of the inventions described herein be the subject of an independent claim of a complete specification and in some cases, the subject of a
 5 *divisional patent application.*

It is also intended that the inventions defined in this provisional application be refined and further developed in subsequent provisional applications.

Inventions

10 According to this specification the inventions include:

- **[Invention 1A]** being a bolt for LOCKS, comprising a pivotal bolt having at least one sideways protruding portion that is engageable behind the peripheral side wall of a slot within a strike plate, said strike plate having an entry aperture connected to an offset aperture of reduced width wherein a side wall of the offset aperture comprises the
 15 engageable peripheral wall, wherein the sideways protruding portion is engageable behind the offset aperture wall over a range of vertical relative dispositions of the bolt and strike plate to accommodate house movement and poor door fitting. Preferably, the protruding portion comprises an arcular blade.

- **[Invention 1B]** being a means of actuating the outwardly biased pivotal latch
 20 bolt for LOCKS including an unlatching crank, at least one unlatching cam connected by shaft to an associated hand operable lever, said latch bolt being supported by a casing and having an opposed return arm disposed on the opposite side of its pivotal axis, wherein the unlatching crank comprises a displaceable member supported within the casing and having at one end a protruding pin comprising part of a pivotal joint between
 25 the crank and bolt (the bolt return having rearwardly a drive recess) and at the other end a driven shoulder that, (is preferably restrained in a substantially vertical channel in a side wall of the casing and), is engageable by a driving shoulder of the unlatching cam to cause the unlatching crank to displace towards the bolt to displace the bolt return downwards to cause the bolt to displace towards the retracted position – (into the
 30 casing) against bolt biasing means. Preferably the crank is upwardly biased.

- **[Invention 1C]** comprising deadlatching means for the pivotal bolt that on latching extends to the fully extended position to be automatically deadlocked (the complete action being called *deadlatching*), the invention including an unlatching lever operable to displace the crank to undeadlock the bolt and to then cause the bolt to

retract. Preferably the drive recess includes a deadlocking portion that when the bolt is fully extended comprises a vertically elongated recess. The crank is upwardly biased to provide outwards biasing for the bolt and to urge the crank towards a configuration where the protruding pin of the crank locates it deadlocking portion to cause the bolt to be dealocked in the fully extended position. The crank being in that configuration restrained against rearwards displacement.

• **[Invention 1D]** comprises pre-latching means to restrains an outwardly biased latch-bolt in a partly extended position prior to latching to facilitate latching, comprising an outwardly auxiliary bolt having an engageable shoulder protruding towards the latch bolt to be engageable by an engaging shoulder of the bolt when the auxiliary bolt is fully extended.

• **[Invention 2B]** comprising a means of actuating a rectilinearly displaceable latch-bolt including an unlatching crank, at least one unlatching cam connected by shaft to an associated hand operable lever, said latch bolt being supported relative to the casing and being displaceable to protrude from the casing, wherein the unlatching crank comprises a displaceable member supported within the casing and having at one end a protruding pin comprising part of a pivotal joint and at the other end a driven shoulder that is engageable by a driving shoulder of the unlatching cam to cause the unlatching crank to displace towards the bolt to displace the first arm of drive rocker to cause the second arm to correspondingly displace to cause the bolt to displace into the casing. Preferably, the second arm supports a sideways protruding pin that lies within a substantially vertical but preferably angled slot of the return portion of the bolt, said first arm being forward biased by a spring so as to outwardly bias the bolt. Preferably bolt is a deadlatching latch bolt where the rocker acts to deadlock the fully extended latch bolt.

• **[Invention 2C]** comprising a rectilinearly displaceable latch-bolt that on latching automatically extends to the fully extended position to be automatically deadlocked (the complete action being called deadlatching), the invention including an unlatching lever operable to displace a rocker to undeadlock the bolt and to then cause the bolt to retract. Preferably the rocker is operably connected to the unlatching lever by an unlatching crank that at one end is connected to a first arm of the rocker by a pin joint while the other end (comprising a driven shoulder) is restrained in a substantially vertical channel in a side wall of the casing. The crank is upwardly biased to provide outwards biasing for the bolt and to urge the crank towards a configuration where it cooperates with the bolt to cause the bolt to be dealocked in the fully extended position.

Preferably the rocker comprises the first arm and a downwardly projecting second arm that supports a sideways protruding pin that locates in a slotted recess of the bolt, said slot being configured such that when the bolt is fully extended a return portion of the slot is adjacent to the pinned protrusion, said return portion being configured such that if the bolt is inwardly displaced by external means till it engages the pin the point of contact by the pin of the slot return is defined in part by a vector that passes through the pivot point of the rocker or above it - this device sometimes being called an over-centre device because the larger the load applied to the bolt the larger becomes the force restraining the bolt against displacement.

• **[Invention 2D]** comprises pre-latching means to restrains an outwardly biased latch-bolt in a partly extended position prior to latching to facilitate latching, comprising an outwardly auxiliary bolt having an engageable shoulder protruding towards the rocker first arm to be engageable by an engaging shoulder of the first arm when the auxiliary bolt is fully extended.

• **[Invention 3]** comprises entry-barring means for locks having either pivotal or rectilinear bolt for locking the exterior unlatching lever while the interior lever remains free to be operated to unlatch the latch bolt said entry-barring means including a stop recess with the exterior unlatching cam and a displaceable stop slide connected to the lower secondary slide described below such that when the secondary slide is displaced to a deadlocking configuration (corresponding to deadlocked remote locks - if there are such) (and corresponding to the deadlocking slide being in the deadlocked configuration) the engaging shoulder of the stop member is simultaneously displaced to engage within the stop recess whereby to restrain the exterior unlatching-cam against displacement.

• **[Invention 4]** comprising means to simultaneously retract all bolts comprising an extension to a deadlocking slide extending from the deadlocking slide to the upper end of the casing to overlay the crank, this extension having an aperture to electively receive a sideways protruding pin that is engageable with the shoulder of the unlatching crank such that when unlatching crank is displaced from the undisplaced position by interior lever operation it displaces the pin [to displace the extension to displace the deadlocking slide to displace the rocker to displace the secondary slide to displace the stop connecting member to displace the stop member] to displace the blade from the stop recess in the exterior unlatching cam while simultaneously displacing the crank to unlatch the latch bolt. By the above means a lock locked by snib or by cylinder into the

second locked configuration can be unlatched by simply operating the interior unlatching lever – all in a simple downward hand operation. Where there are remote locks, the same action also causes all remote bolts to fully retract.

• **[Invention 5]** comprising deadlocking means comprising a deadlocking slide
5 engageable with the extended bolt (when the deadlocking slide being in the deadlocking configuration) to restrain (or or if the lock is deadlatching type to assist in retraining) the latch-bolt from being displaced from the fully extended position, said deadlocking slide be actuateable by an angularly displaceable first cam having a radially protruding cam arm and by an angularly displaceable snib-arm said snib arm having a sideways
10 protruding pin that engages in a horizontal slot in the deadlocking slide, said deadlocking slide being operably connected to the arm of the first cam by a drive recess having an upper drive face on which the cam engages to drive the deadlocking cam towards the deadlocking configuration and having a lower drive face on which the cam engages to drive the deadlocking cam from the deadlocking configuration and an exit
15 shoulder connected to the upper drive face disposed such that when in the deadlocking configuration the first cam can be disposed such that an end face of the cam (a face of constant radius) is adjacent the exit shoulder such that the force that is applied to the first cam by the deadlocking slide when an attempt is made to move the deadlocking slide from the deadlocking configuration has a direction that passes through the pivotal
20 axis of the cam and so the cam cannot be so rotated and the first cam in this configuration restrains the deadlocking slide whereby to define two locking modes: the first cam arm within the drive recess and the deadlocking slide substantially fully displaced into the deadlocking configuration by the snib arm – second mode; the first cam arm within the drive recess and the deadlocking slide substantially fully displaced
25 into the deadlocking configuration by the first arm (the first arm being operably connected to a cylinder) – second deadlocking configuration; the deadlocking slide fully displaced into the deadlocking configuration and the first cam arm displaced from within the drive recess (the first arm being operably connected to a cylinder) to restrain the deadlocking slide fully displaced in the deadlocking configuration – first deadlocking
30 configuration from which the deadlocking slide cannot be displaced by the snib arm. Preferably the deadlocking slide supports a spring loaded ball that is engageable in recesses in the side of the casing corresponding to an undisplaced slide and a deadlocked slide in the second deadlocking configuration. Preferably the first cam

comprises part of a free-movement-cylinder, and preferably the snib arm is connected to an interior hand operable snib lever by a shaft).

[Invention 6] comprises a deadlocking slide engageable with an extended bolt to restrain (or or if the lock is deadlatching type to assist in retraining) the bolt from
5 being displaced from the fully extended position, said deadlocking slide being actuateable by an angularly displaceable first cam having a radially protruding arm and by an angularly displaceable snib-arm having a sideways protruding pin that engages in a horizontal slot in the deadlocking slide wherein the snib-arm is connected to an opposed arm to comprise a rocker member, said opposed arm being connected to a
10 secondary slide (that acts counter to the deadlocking slide) by a sideways protruding pin of the opposed arm that engages in a horizontal slot in the secondary slide, and wherein the deadlocking slide and secondary slide (preferably being rectilinearly displaceable simultaneously in opposite directions) have end portions adapted to be connected to rods and/or to an inner Bowden cable that connect to remote locking means whereby to
15 enable deadlocking slide movement to actuate the remote bolts of the remote locking means

[Invention 7] comprising a secondary slide having a recess to (electively) support a return shoulder of an end of a stop connecting member so as to operably connect a stop slide comprising part of means of restraining the exterior unlatching lever to
20 the secondary slide. The stop connecting member in the vicinity of the unlatching cams has a return portion connected to the stop slide that has a blade. This blade is configured such that when the lock is locked by the snib the locking the blade is displaced into the stop recess of one or the other an unlatching cam. Preferably, the stop slide is supported between side walls of an extension to the casing and retain within
25 the casing by the stop connecting member which in the vicinity of the stop slide can be displaced rearwardly to release the stop slide enabling it to be withdrawn, inverted and replaced to be engageable the stop recess of the other unlatching cam whereby to accommodate left and right hand doors where one unlatching cam is the exterior unlatching of a left hand door and the other is the exterior unlatching cam of a right hand
30 door and where in each case it is the exterior unlatching cam one wishes to restrain.

[Invention 8] comprises adaptations to accommodate remote locks wherein the lower end of the secondary slide comprising a horizontal rod recess (in a plane parallel the face of the door) and the stop slide and/or the deadlocking slide extension has a horizontal rod recess (in a plane at right angles to the face of the door). Each of these

rod recesses and the material adjacent the recesses is configured to enable the recess to accept the right angled return portion of a rod that connects to lower and upper remote locks respectively or to receive the return end portions of an inner Bowden cable.

5 **[Inventions 9]** combining at least any two of the above defined inventions to provide :

• A lock having a single rod passing through the unlatching cams [or each unlatching lever of the lock is connected to an unlatching cam by a separate rod] so that when the lock is locked by operation of the snib lever it can only be unlocked by the snib
10 lever displacing the deadlocking slide from behind the latch bolt allowing it to be inwardly displaced by unlatching crank displacement. Once unlocked it can be unlatched by operating the unlatching levers. If the lock has a cylinder it can be unlocked by the cylinder. If it is locked to the first configuration by the cylinder it can only be unlocked by the cylinder.

15 • A lock where each unlatching lever of the lock is connected to an unlatching cam by a separate rod and an extension to the deadlocking slide supports a pin and a stop slide is connected to the secondary slide. When the lock is locked by operation of the snib lever the exterior unlatching lever is restrained against displacement and the latch bolt is deadlocked by the deadlatching means and by the deadlocking slide. It can be
20 unlocked by the snib lever by displacing the deadlocking slide from behind the latch bolt and by operation of the interior lever that can be operated to displace the unlatching crank to drive the pin to displace the deadlocking slide extension to displace the deadlocking slide from behind the latch bolt while at the same time unlatching the latch bolt. If the lock has a cylinder it can be unlocked by the cylinder. If it is locked to the first
25 configuration by the cylinder it can only be unlocked by the cylinder.

• A lock where each unlatching lever of the lock is connected to an unlatching cam by a separate rod and a stop slide is connected to the secondary slide and there is no deadlocking slide. When the lock is locked by operation of the snib lever the exterior unlatching lever is restrained against displacement and the latch bolt remains
30 deadlocked by the deadlatching means. It can be unlocked by the snib lever by displacing the stop slide from engagement with the exterior unlatching cam.

• A lock where each unlatching lever of the lock is connected to an unlatching cam by a separate rod there is an extension to the deadlocking slide and a stop slide is connected to the secondary slide. Remote locks are connected to either the secondary

slide or the extension to the deadlocking slide. When the lock is locked by operation of the snib lever the exterior unlatching lever is restrained against displacement, the latch bolt remains deadlocked by the deadlatching means while being deadlocked by the deadlocking slide and the remote bolts are actuated to the extended position. It can be
5 unlocked by the snib lever by displacing the deadlocking slide from behind the latch bolt to enable the lock to be unlatched. If the lock has a cylinder it can be unlocked by the cylinder. If it is locked to the first configuration by the cylinder it can only be unlocked by the cylinder.

- A lock where each unlatching lever of the lock is connected to an unlatching cam
10 by a separate rod there is an extension to the deadlocking slide supports a pin and a stop slide is connected to the secondary slide. Remote locks are connected to either the secondary slide or the extension to the deadlocking slide. When the lock is locked by operation of the snib lever the exterior unlatching lever is restrained against displacement, the latch bolt remains deadlocked by the deadlatching means while being
15 deadlocked by the deadlocking slide and the remote bolts are actuated to the extended position. It can be unlocked by the snib lever by displacing the deadlocking slide from behind the latch bolt and by operation of the interior lever that can be operated to displace the unlatching crank to drive the pin to displace the deadlocking slide extension to displace the deadlocking slide from behind the latch bolt while retracting remote bolts
20 while at the same time unlatching the latch bolt. If the lock has a cylinder it can be unlocked by the cylinder. If it is locked to the first configuration by the cylinder it can only be unlocked by the cylinder.

- A lock including an interior snib-lever and/or key operable free-movement-cylinder each being operable to displace remote bolts in remote locks, AND/OR
25 an interior snib-lever and/or key operable free-movement-cylinder each being operateable to displace remote bolts in remote locks while deadlocking the latch bolt, AND/OR an interior snib-lever and/or key operable free-movement-cylinder each being operateable to *disable the exterior lever*, AND/OR a deadlocking slide operably connectable to remote bolts by counteracting rods whereby the remote bolts can be
30 actuated between retracted and extended positions by displacement of the deadlocking slide, said lock being reconfigurable to be connectable to remote bolts by rods/a rod, each said rod displacing simultaneously in the same direction in the same direction whereby the remote bolts can be actuated between retracted and extended positions by displacement of the deadlocking slide. Said lock being connectable to remote bolts by

Bowden cables whereby the remote bolts can be actuated between retracted and extended positions by displacement of the deadlocking slid

The inventions described above in forms of the invention have:

- 5 • the bolt comprising a latch bolt that is held in a partly extended position prior to latching.
- the strike plate designed to deform as described in [Watts 671618]
- the latch bolt having a leading portion with curved, chamfer or otherwise profiled sides to facilitate or assist latching wherein the latch is engageable on either side
- 10 by a strike plate to be inwardly displaced by the strike plate during latching whereby to be and suitable both left hand and right hand hinged doors.
- the bolt being supported in the casing between the unlatching cam and the key operable double cylinder.
- dimension L of Figure 1 is 85.00 mm whereby to render the lock compatible
- 15 with door furniture of common configuration.
- the dimension l_1 is substantially the same as that of common security door locks. In some forms of LOCK/S $l_2 = l_1/2$
- the casing is common to locks having pivotal bolts and rectilinearly displaceable bolts
- 20 • the unlatching cam/s cylinder, deadlocking slide deadlocking slide extension, stop slide, slide 27 and snib, snib rocker and lower slide 51 are common to locks having pivotal bolts and rectilinearly displaceable bolts

The invention further provides LOCK/S substantially as described herein with
25 reference to and as illustrated in the accompanying drawings.

Description of lock problems/deficiencies addressed by the invention

LOCK/S described herein address a number of problems and deficiencies in commonly available locks for hinged and sliding doors – some of these addressed are:

30 Commonly used locks employed in french doors are locked by key to simultaneously restrain both interior unlatching levers from being operated to unlatch the lock – the cylinder must then be operated from interior or exterior to enable unlatching.

It would be more convenient to have an interior hand operable snib-locking lever by which to configure the lock to prevent exterior unlatching of the lock while enabling the interior lever to be operated to unlatch the lock to permit exit. This functionality is also applicable to security doors having close weaved infill material.

5 Where the lock is connected to remote locks, it would more convenient and safer (fire consideration reasons) to have operation of the interior unlatching lever to operate the remote locks to cause the remote bolts to retract. This functionality is applicable to french doors and is also applicable to security doors having close weaved infill material.

10 Locks commonly used in hollow-framed doors (particularly french doors) employ a double profile cylinder having a clutch and require the key to be rotated 360 degrees for locking and unlocking – this being difficult because of the proximity of the key to the edge of the door. It would be more convenient to employ a free-rotation-cylinder.

15 While some applications are more suited to multipoint locks as described in [Watts AU 633318] french and security doors are more suited to mortice type remote locks that are supported within the wing frame. It is desirable that the invention provides means of attachment and actuation for transmission means comprising Bowden cables where the inner cable connected to each lock displaces simultaneously, or where the remote locks are connected to the centre lock by a rod or rods that act simultaneously in the same direction, or where the remote locks are connected to the
20 centre lock by counter-acting rods.

25 To be suitable for french doors, locks must have a lock body of small depth and to be suitable for security doors, the lock must also have a small width. Additionally to be suitable for security doors, the lock must employ an "industry standard" door preparation comprising a slotted aperture in the edge of the door and two apertures in each side of the door comprising vertically elongated oval shapes. These requirements define a small lock body in which the location of components having passage through the wing (such as unlatching handle shafts, the cylinder etc) must have passage within a vertically elongated oval shape. Typically, the lock bolt has a displacement of about 16 MM and the depth of the lock body is 40 MM and typically the width of the lock body is 15.5 MM

30 Locks commonly employed in security and french doors employ interior and exterior furniture comprising a handle or knob supported within a back plate and spring biased towards an "undisplaced" configuration – (usually horizontal). For fitting, cost and manufacturing reasons, it is advantageous for each lever to be free within the backplate and obtain its biasing from the lock-body via a shaft connected to the lock-

body. Although this feature is achieved in known large lock-body locks through the employment of a rectilinearly displaceable slide, it is not common in locks for hollow-framed-doors.

Locks commonly employed in security doors employ an auxiliary bolt to retain a latch-bolt in a partly extended configuration to facilitate latching such as [Watts AU 696343 and AU 690580 and AU633318] – the latch-bolt in these cases having a leading end profiled on both sides to accommodate both left hand and right hand doors. For reasons including ease of fitting, compatability with the improved bolt subject of this specification, cost and manufacturing reasons, it is advantageous for the function of the auxiliary bolt to be executed by the bolt itself.

Locks commonly employed in french doors have both a latching bolt and a deadlocking bolt and for reasons of fitting, cost, manufacture and compatibility with other requirements it is preferable to employ a single deadlatching latch-bolt

Locks commonly employed in security doors have special configured handles and back-plates and for reasons of interchangeability, cost, manufacture and compatibility with french door lock requirements it is preferable to employ handle/backset subassemblies of common configuration where the distance between the handle axis of rotation and cylinder complies with an industry standard.

Locks commonly employed in french doors do not have an interior "locking-snib" by which to lock the latch bolt as do common security door locks. Where a locking snib is employed, it is preferable for its operation to comprise deadlocking the latch bolt while simultaneously actuating the bolts of the remote-locks - as does the locking-snib of locks by [Watts AU 706589 and associated divisionals]

This and prior related provisional applications (related being defined as meaning other provisional applications cited in the complete applications associated with this provisional) describe various LOCK/S – some LOCK/S addressing the problems and deficiencies described above.

Description of the Preferred Embodiments

In a form the invention includes a LOCK for a displaceable wing that includes a pivotal bolt 101 that has at least one sideways protruding portion 106 that is engageable behind the periperal side wall 107 of a slot 108 within a strike plate 109, said strike plate having an entry aperture 110 connected to an offset aperture 111 of reduced width wherein a side wall of the offset aperture comprises the engageable

peripheral wall, wherein the sideways protruding portion is engageable behind the offset aperture wall over a range of vertical relative dispositions of the bolt and strike plate to accommodate house movement and poor door fitting. Preferably, the protruding portion comprises an arcular blade as shown in Fig 1. Preferably, the bolt has a leading end

5 profiled on both sides to accommodate both left hand and right hand doors.

In a form the invention includes a LOCK for a displaceable wing that includes means of actuating an outwardly biased pivotal latch-bolt including an unlatching crank 12, at least one unlatching cam 13 connected by shaft to an associated hand operable lever, said bolt being supported by a casing 14 and having an opposed

10 return arm 115 disposed on the opposite side of its pivotal axis, wherein the unlatching crank comprises a displaceable member within the casing and having at one end a protruding pin comprising part of a substantially pivotal joint and at the other end a driven shoulder 17 supported within a substantially vertical slot in a side of the casing, said driven shoulder being engageable by a driving shoulder 23 of the unlatching cam

15 to cause the unlatching crank to displace towards the bolt to displace a return portion of the bolt to cause the bolt to retract (displace) into the casing against bolt biasing means derived from the crank being upwardly biased. Preferably the unlatching crank pin 112 locates in a recess 113 of the bolt return to comprise the substantially pivotal joint .

20 Preferably the cam has cylindrical portions that are supported in a circular aperture in a side of the casing.

In a form the invention includes a LOCK for a displaceable wing that includes a deadlatching means 28 for LOCKS having a pivotal latch-bolt, said means comprising an unlatching lever operable to displace the crank to undeadlock the bolt and to then cause the bolt to retract. Preferably the drive recess includes a deadlocking portion

25 114 that when the bolt is fully extended comprises a vertically elongated recess. The crank is upwardly biased to provide outwards biasing for the bolt and to urge the crank towards a configuration where the protruding pin of the crank locates in the deadlocking portion of the recess to cause the bolt to be dealocked in the fully extended position. The crank being in that configuration restrained against rearwards displacement.

30 In a form the invention includes a LOCK for a displaceable wing that includes pre-latching means 38 for LOCKS including an outwardly biased pivotal latch-bolt, said pre-latching means to restrain the latch-bolt in a partly extended position prior to latching and to facilitate latching comprising an outwardly auxiliary bolt having an

engageable shoulder 116 protruding towards the latch bolt to be engageable by an engaging shoulder 117 of the bolt when the auxiliary bolt is fully extended. Said auxiliary bolt having an upwardly protruding arm 118 adjacent the engageable shoulder that is engageable with a shoulder 119 of the casing as the auxiliary bolt is
5 inwardly displaced to displace the shoulder from the locus of movement of the bolt.

Some forms of LOCK/S include an outwardly biased rectilinearly displaceable latch-bolt 1 comprising a first bolt portion 1A displaceable from the casing and a return bolt portion 1B supported within the casing, and an unlatching crank 12
10 preferably supported within the casing 14 at the top by a vertical slotted recess in the side wall of the casing, and at least one unlatching cam 13 having a cylindrical boss portion supported within an aperture in the casing side wall, said unlatching cam 13 having an axial square recess to mate with a drive shaft 13A that connects to an associated hand operable unlatching lever (either interior or exterior not shown). The
15 latch-bolt is supported relative to the casing 14 by an aperture within a face plate 100 and preferably also by interior finned extensions of the sides walls of the casing and by adjacent components.

The unlatching crank for the outwardly biased rectilinearly displaceable latch-bolt 1 comprises a displaceable member having a driven shoulder 17 supported in the
20 vertical slot that is engageable by a driving shoulder 23 (of a driving portion 13A of the unlatching cam) that is horizontally displaced from the pivotal axis of the unlatching cam, the unlatching cam being angularly displaceable to displace the driving shoulder towards the driven shoulder whereby to cause the unlatching crank to displace towards the latch bolt to displace the first arm 18B (of drive rocker 18) downwardly to cause
25 the second arm 18C to correspondingly displace downwardly and rearwardly to cause the bolt to retract (displace) rearwardly into the casing against biasing means comprising spring 19.

The forked rocker 18 comprises a forked member supported by a pinned extension 18A of a casing side wall, said pin being located towards the rear of the
30 casing while the arms extend forward – the first arm 18B extending forward and upwards to connect at a pin joint to the crank while the return arm 18C extends forward and downwards to overlap the return bolt portion.

The latch bolt (pivotal and rectilinear) in some form of LOCK/S has a leading portion 1E with curved, chamfer or otherwise profiled sides to facilitate or assist latching wherein the latch is engageable on either side by a strike plate to be inwardly displaced by the strike plate during latching whereby to be and suitable both left hand and right hand hinged doors.

The return arm 18C for the outwardly biased rectilinearly displaceable latch-bolt supports in the overlapping portion (disposed from the pivotal axis of the rocker) a sideways protruding pin 21 that lies within a substantially vertical but preferably angled slot 22 of the return portion of the bolt, said forked rocker preferably being anticlockwise biased by a spring 19 that acts on the crank so as to outwardly bias the latch bolt - said forked rocker and bolt being operably coupled by said arrangement.

The unlatching crank is biased towards the unlatching cam by biasing means preferably comprising a torsion spring 19 having an arm that acts on the unlatching crank. A tension spring is connected to a portion of the the unlatching cam on the opposite of its pivotal axis to the lever to urge the unlatching lever against displacement.

The above arrangement finds application in LOCK/S where there is an exterior unlatching cam connected to an exterior lever by an exterior shaft and an interior unlatching cam connected to an interior lever by an interior shaft whereby the bolt can be caused to retract by operation of either lever .

In an alternative form there is a single shaft interconnecting each lever.

In a form of the invention the LOCK/S unlatching cams have a stop recess 26 and the lock includes a displaceable stop slide 102 that is connected to the lower secondary slide described below (by a vertically elongated stop connecting member 27 positioned adjacent the rear casing wall) such that when the secondary slide is displaced downwardly to the deadlocking configuration, (so called because the counter-acting deadlocking slide is simultaneously displaced to its deadlocking configuration - and corresponding to any remote locks being extended - if there are such), the engaging stop blade of the stop slide 27 is simultaneously displaced towards the unlatching cams. The engaging blade is connected to the stop slide to engage within the stop recess of either unlatching cams. At fitting of the lock, the blade is configured to be engageable in the exterior unlatching cam. This is described in more detail below.

In a form of LOCK/S described below, the deadlocking slide is displaced by operation of the interior unlatching cam whereby to displace the stop slide from the stop recess while unlocking the remote locks.

In a form of LOCK/S where the latch bolt is rectilinearly displaceable there is
 5 **deadlatching means 28** comprising the drive rocker 18 wherein the slot 22 is configured such that when the bolt is fully extended a return portion 22A of the slot is presented to the pinned protrusion 20, said **return portion 22A** being configured such that if the bolt is inwardly displaced by external means till it engages the pin 20 the point
 10 **of contact 22B** by the pin of the slot return is defined in part by a vector that passes through the pivot point of the rocker 18 or above it. This device is sometimes called an over-centre device where the larger the load applied to the bolt the larger becomes the force restraining the bolt against displacement.

In the form of LOCK/S where the latch bolt is rectilinearly displaceable there is pre-latching means 38 to restrains the latch-bolt in a partly extended position prior to
 15 latching and to facilitate latching, comprising an outwardly **auxiliary bolt 38A** having an engageable **shoulder 38B** protruding towards the rocker first arm to be engageable by an **engaging shoulder 38C** of the first arm when the auxiliary bolt is fully extended. The engageable shoulder being displaced from the locus of movement of the engaging shoulder by inwards displacement of the bolt.

20 In a form the LOCK/S includes a **deadlocking slide 40** and a latch-bolt displaceable to a fully extended position where it protrudes from the casing, in which position it is cooperable with the deadlocking slide 40 to *restrain (or if the lock is deadlatching type, to assist restrain)* the latch-bolt from being displaced from the fully extended position, said deadlocking slide being operably connected to an angularly
 25 displaceable **first cam 41** having a radially protruding **arm 41A** [that in one form is operably connected as described in Watts AU 706589 and as in associated divisionals and where in forms of the invention the first cam comprises part of a free-rotation-cylinder) said deadlocking slide in forms of the invention also being operably connected to an interior hand operable member (that in one form comprises a snib lever (or locking
 30 lever) that is connected by a shaft to an angularly displaceable **snib-arm or locking arm 42** supported in the casing and having a sideways protruding **pin 43** that engages in a **horizontal slot 44** in the deadlocking slide. Where the deadlocking slide is operably connected to the first cam per [Watts AU 706589 and associated divisionals] the

deadlocking slide has a **drive recess 45** having an **upper drive face 46** on which the first cam arm engages to drive the deadlocking cam towards the deadlocking configuration and having a **lower drive face 47** on which the cam arm engages to drive the deadlocking slide from the deadlocking configuration and an **exit shoulder 48**

5 (preferably comprising an angled face) connected to the upper drive face disposed such that when in the deadlocking configuration the first cam can be disposed such that an end face of the cam (a face of constant radius) is adjacent the exit shoulder such that the force that is applied to the first cam by the deadlocking slide when an attempt is made to move the deadlocking slide from the deadlocking configuration (as might occur
10 in an attempt to rotate the snib lever) has a direction that passes through the pivotal axis of the cam and so the cam cannot be so rotated and the first cam in this configuration restrains the deadlocking slide. This aspect in one form of the invention is as described in [co-pending divisional application 81454/01 by Watts and the parent application of this divisional] which is included herein by reference.

15 There are two locking modes: the first cam arm within the drive recess and the deadlocking slide substantially fully displaced into the deadlocking configuration by the snib arm – second mode; the first cam arm within the drive recess and the deadlocking slide substantially fully displaced into the deadlocking configuration by the first arm (the first arm being operably connected to a cylinder) – second deadlocking configuration;
20 the deadlocking slide fully displaced into the deadlocking configuration and the first cam arm displaced from within the drive recess (the first arm being operably connected to a cylinder) to restrain the deadlocking slide fully displaced in the deadlocking configuration – first deadlocking configuration from which the deadlocking slide cannot be displaced by the snib arm. Preferably the deadlocking slide supports a spring loaded ball that is
25 engageable in recesses in the side of the casing corresponding to an undisplaced slide and a deadlocked slide in the second deadlocking configuration. Preferably the first cam comprises part of a free-movement-cylinder, and preferably the snib arm is connected to an interior hand operable snib lever by a shaft).

30 Preferably the snib-arm is connected to an **opposed arm 49** to comprise a **rocker member 50**, said opposed arm being connected to a **secondary slide 51** (that acts counter to the deadlocking slide) by a sideways protruding **pin 52** of the opposed arm that engages in a horizontal **slot 53** in the secondary slide, and wherein the deadlocking slide and secondary slide (preferably being rectilinearly displaceable simultaneously in opposite directions) have **end portions 54** adapted to be connected to rods and/or an

inner **Bowden cable 55** that connect to remote locking means whereby to enable deadlocking slide movement to actuate the remote bolts of the remote locking means (being an upper and/or lower remote-locks). It should be noted that the snib arm when comprising part of a rocker, need not necessarily be connected to a snib lever.

5 In some forms of LOCK/S the secondary slide has a **recess 51A** to (electively) support a return shoulder 51 B of an end of the stop connecting member 27 so as to operably connect to the stop slide The stop connecting member in the vicinity of the unlatching cams has a return portion connected to the stop slide that has a blade 51C – this being vertically displaceable as the secondary slide. This blade is configured such
10 that when the lock is locked by the snib [while the first cam arm 41A is within the drive recess and the deadlocking slide is fully displaced into the second deadlocking configuration – second deadlocking configuration] or locked by the cylinder [while the first cam arm 41A is within the drive recess and the deadlocking slide is fully displaced into the deadlocking configuration – second deadlocking configuration] or locked by the
15 cylinder [while the first cam arm 41A is displaced from within the drive recess to restrain the deadlocking slide fully displaced in the deadlocking configuration – first deadlocking configuration from which the deadlocking slide cannot be displaced by the snib arm], in each case of locking the blade 51C is displaced into the stop recess of one or the other an unlatching cam. The stop slide is supported between side walls of an extension to the
20 casing and retain within the casing by the stop connecting member which in the vicinity of the stop slide can be displaced rearwardly to release the stop slide enabling it to be withdrawn, inverted and replaced to be engageable the stop recess of the other unlatching cam. This is necessary to accommodate left and right hand doors where one unlatching cam is the exterior unlatching of a left hand door and the other is the exterior
25 unlatching cam of a right hand door and where in each case it is the exterior unlatching cam one wishes to restrain.

In some forms of LOCK/S there is an **extension 40A** to the deadlocking slide that preferably comprises a plate like member that extends from the deadlocking slide to the upper end of the casing to overlay the crank, the unlatching crank having an
30 aperture to electively receive a sideways protruding **pin 58** that is engageable with the shoulder 16 of the extension 40A such that when unlatching crank is displaced from the undisplaced position by interior lever operation it displaces the pin [to displace the extension to displace the deadlocking slide to displace the rocker to displace the secondary slide to displace the stop connecting member to displace the stop member] to

displace the blade from the stop recess in the exterior unlatching cam while simultaneously unlatching the latch bolt. By the above means a lock locked by snib or by cylinder into the second locked configuration can be unlatched and unlocked by simply operating the interior unlatching lever – all in a simple downward hand operation. And
 5 where there are remote locks, the same action also causes all remote bolts to fully retract.

Preferably the deadlocking slide is configured such that as the interior lever is rotated the initial displacement of the unlatching crank causes pin 58 to displace to displace the deadlocking slide so as no longer restrains the bolt. Further displacement
 10 causes the bolt to commence inwards displacement while causing the deadlocking member to displace further from the bolt – it is important that the deadlocking slide while (preferably) engaging behind a portion of the bolt at the very end of its upwards (deadlocking) stroke, always allow the bolt free movement as it is inwardly displaced by the unlatching crank - this requirement impacting heavily on the shape of the latch bolt
 15 and deadlocking slide and rocker.

In some forms of LOCK/S the lower end of the secondary slide has a horizontal rod recess (in a plane parallel the face of the door) and the stop slide has a horizontal rod recess (in a plane at right angles to the face of the door). Each of these rod
 20 recesses and the material adjacent the recesses is configured to enable the recess to accept the right angled return portion of a rod that connects to lower and upper remote locks respectively. Alternatively, the rod recess may comprise a recess configured to receive the return end portion of an inner Bowden cable.

In some forms of LOCK/S the lower end of the secondary slide has a horizontal rod recess (in a plane parallel the face of the door) and the extension to the deadlocking
 25 slide has a horizontal rod recess (in a plane at right angles to the face of the door). Each of these rod recesses and the material adjacent the recesses is configured to enable the recess to accept the right angled return portion of a rod that connects to lower and upper remote locks respectively. Alternatively, the rod recess may comprise a recess configured to receive the return end portion of an inner Bowden cable.

30 In some forms of LOCK/S the bolt is supported in the casing between the unlatching cam and the key operable double cylinder.

In some forms of LOCK/S dimension L (distance between axis of unlatching cam and axis of first cam) of Figure 1 is 85.00 mm whereby to render the lock compatible with door furniture of common configuration.

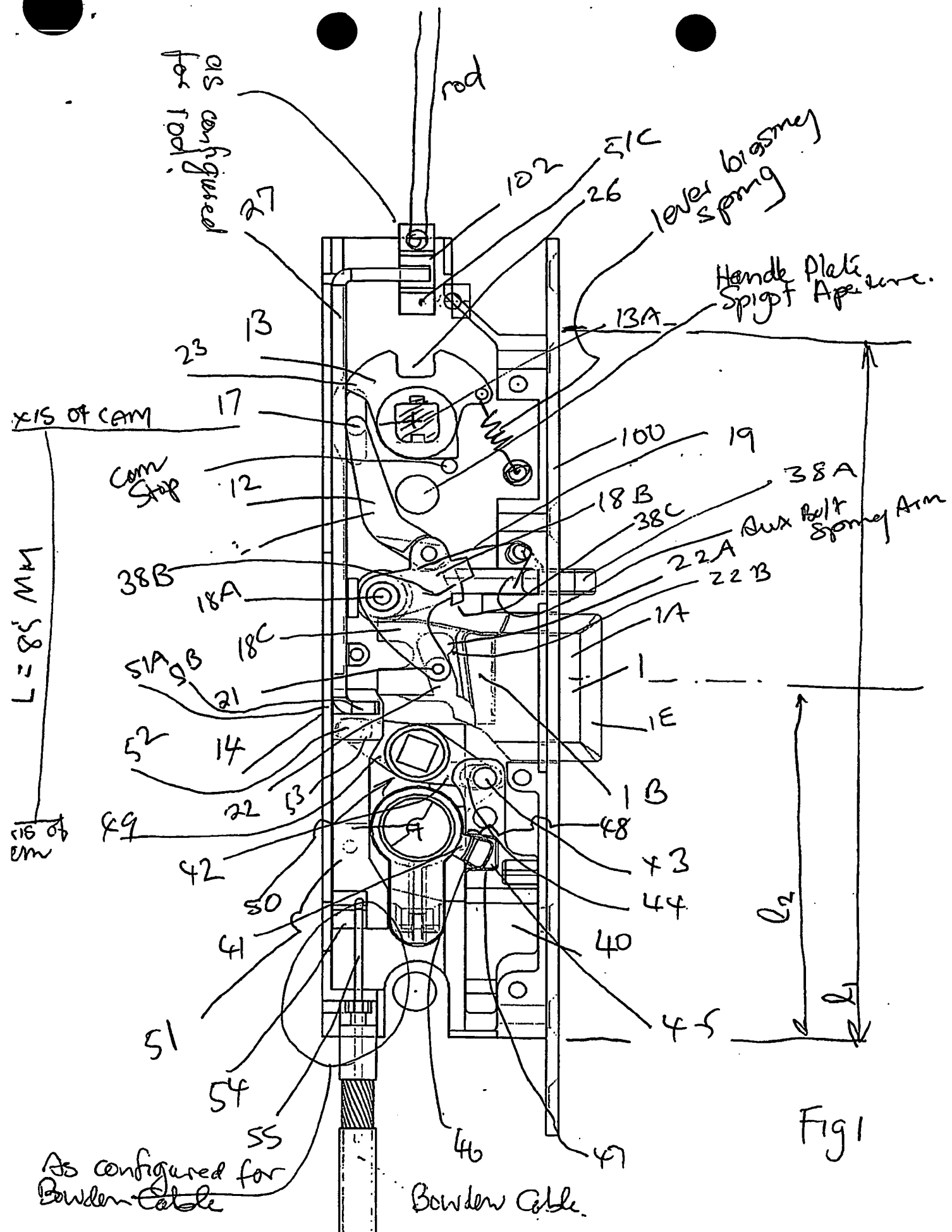
In some forms of LOCK/S, the casing is comprised of a box-like walled casing and a pressed metal apertured lid. The casing has towards the top and bottom end of the front wall nut recess to receive a nut. The face plate comprising a vertically elongated plate preferably comprising brass or steel that has apertures to provide passage for screws that retain the face plate connected to the casing – the screws passing through the face plate to engage in the nuts. Where a lock of increased set back is required, a spacer member is placed between the face plate and casing and a longer bolt is employed.

In some forms of LOCK/S dimension l_1 (length of casing adjacent the face plate) is substantially the same as that of common security door locks. In some forms of LOCK/S $l_2 = l_1/2$ so that the bolt is in the middle of the face plate

Preferably, the casing is common to locks having pivotal bolts and rectilinearly displaceable bolts and preferably, the unlatching cam/s cylinder, deadlocking slide deadlocking slide extension, stop slide, slide 27 and snib, snib rocker and lower slide 51 are common to locks having pivotal bolts and rectilinearly displaceable bolts

It will be appreciated that a combination of at least any two of the above defined inventions will define a further invention.

The invention further provides LOCK/S substantially as described herein with reference to and as illustrated in the accompanying drawings.



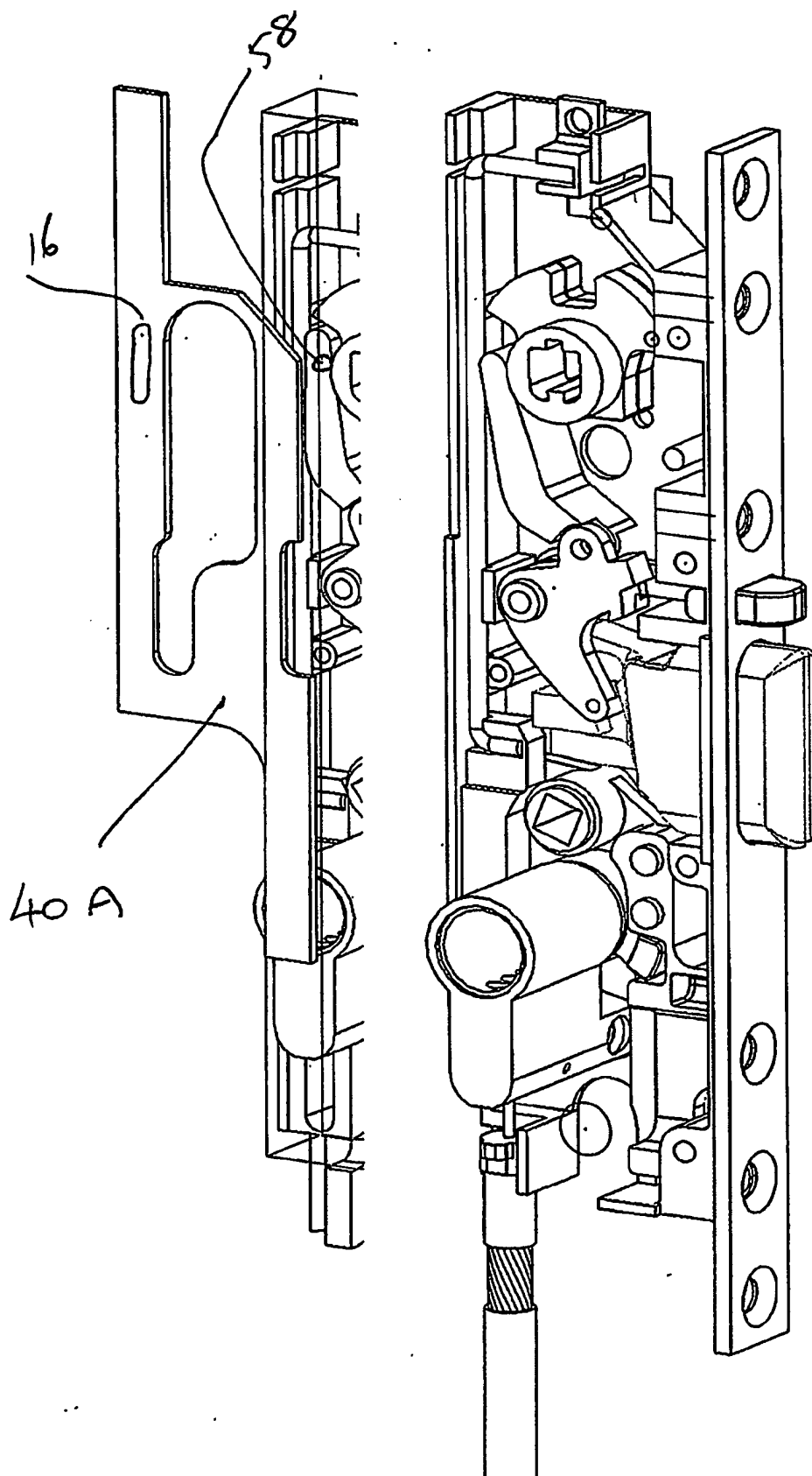


Fig 2

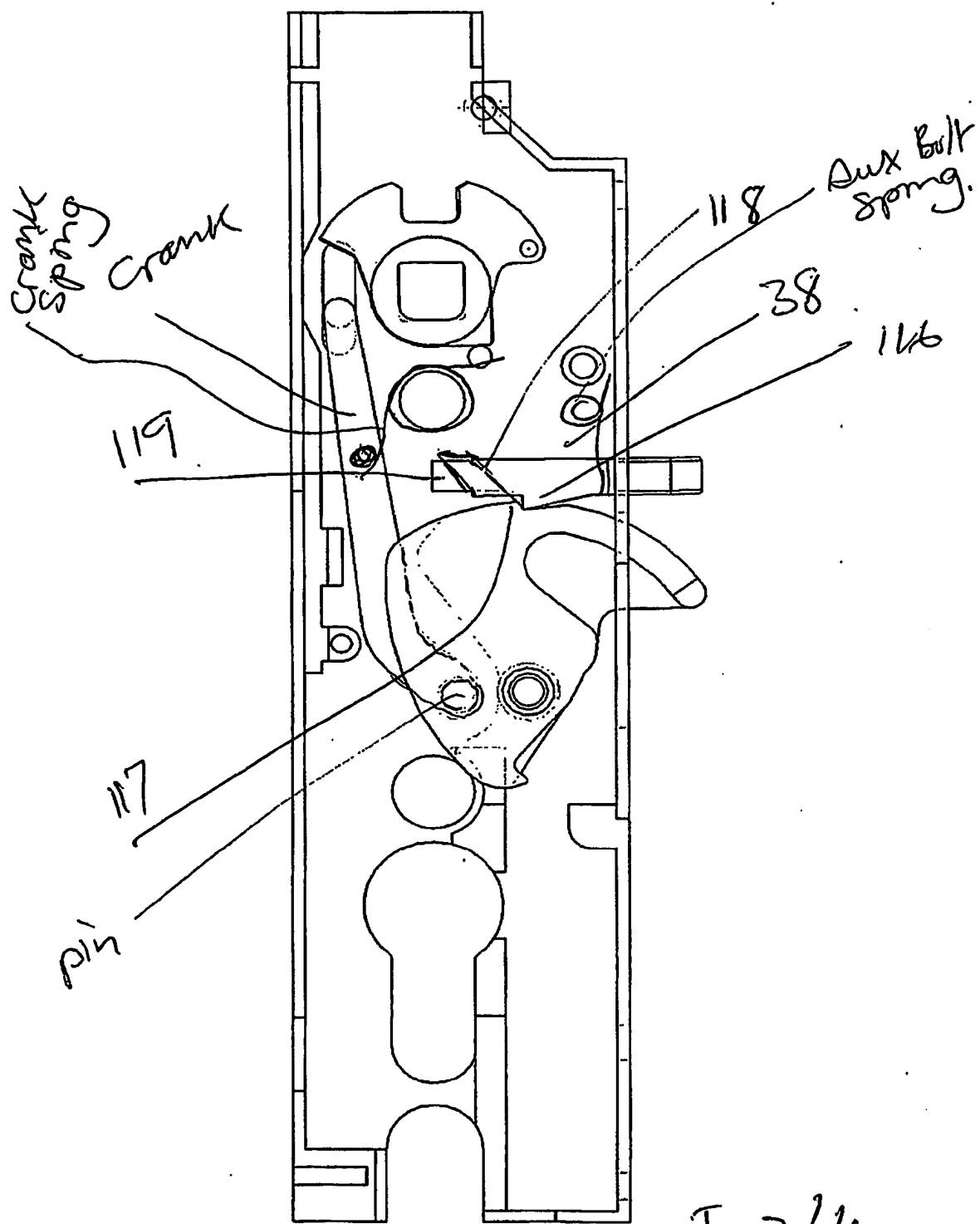


Fig 3/4

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